UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/032,418	12/21/2001	Edmund Walker	476-2082	5671

7590 12/20/2004

William M. Lee, Jr.
LEE, MANN, SMITH, MCWILLIAMS, SWEENEY & OHLSON
P.O. Box 2786
Chicago, IL 60690-2786

EXAMINER	
LEUNG, CHRISTINA Y	

ART UNIT	PAPER NUMBER
2633	

DATE MAILED: 12/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/032,418	WALKER ET AL.
	Examiner	Art Unit
	Christina Y. Leung	2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 December 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 December 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 12 and 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 12 and 13 are indefinite because they currently depend on themselves (i.e., on claims 12 and 13, respectively), and it is unclear what elements are recited in the claims. Based on Applicants' other claims and Applicants' specification, Examiner respectfully suggests that Applicants may amend claims 12 and 13 to each depend on claim 11 instead.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1 and 2 are rejected under 35 U.S.C. 102(e) as being anticipated by Blumenthal et al. (US 2002/0044322 A1).

Regarding claim 1, Blumenthal et al. disclose a method of measuring a signal to noise ratio of a received optical signal in an optical transmission system (Figures 1, 4, and 6), the method comprising:

at an optical transmitter, transmitting a bit sequence (Figure 4 shows an optical transmitter labeled "Laser"; page 3, paragraph [0055] and page 4, paragraph [0056]);

at a receiver (Figure 6 shows a receiver in the form of a photodetector, which is not explicitly labeled but depicted by a standard symbol as the element connected to the "Optical tunable filter"):

receiving a wavelength modulated with the bit sequence (wherein the wavelength is selected by the optical tunable filter),

converting the received wavelength to a corresponding electrical signal (using the photodetector),

determining a spectrum for the electrical signal (using the "Electrical Spectrum Analyzer") and

determining an electrical signal to noise ratio from the spectrum for that received optical signal (page 4, paragraphs [0062]-[0068]).

Examiner notes that Figure 6 also shows that the optical receiver is connected to an optical transmitter (located on the right side of the figure) that resembles the one also shown in detail in Figure 4.

Regarding claim 2, Blumenthal et al. disclose that the transmission system has one or more optical add/drop sites. Although they do not explicitly show add/drop sites in Figures 1, 4, or 6, Blumenthal et al. disclose that a "next generation optical network" includes add/drop sites

(page 1, paragraph [0006]). Blumenthal et al. disclose that their method of measuring a signal to noise ratio is specifically used in an optical transmission system that is described as a "second generation" or "next generation" network (page 4, paragraph [0062] and page 6, paragraph [0092]).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 6, 7, and 11-14 rejected under 35 U.S.C. 103(a) as being unpatentable over Blumenthal et al. in view of Sakamoto et al. (US 2002/0048062 A1).

Regarding claim 6, Blumenthal et al. disclose a method in a wavelength division multiplexed optical transmission system comprising an optical transmitter, a receiver and a transmission path therebetween (Figures 1, 4, and 6), the method comprising:

at the transmitter, transmitting a bit sequence as a modulation on each wavelength (Figure 4 shows an optical transmitter labeled "Laser"; page 3, paragraph [0055] and page 4, paragraph [0056]); and

at the receiver (Figure 6 shows a receiver in the form of a photodetector, which is not explicitly labeled but depicted by a standard symbol as the element connected to the "Optical tunable filter"):

receiving each wavelength modulated with the bit sequence (using the optical tunable filter),

converting that received wavelength to a corresponding electrical signal (using the photodetector),

determining a spectrum for the electrical signal (using the electrical spectrum analyzer) and determining from that spectrum an electrical signal to noise ratio (page 4, paragraphs [0062]-[0068]).

Examiner notes that although Figure 4 shows one transmitter having one wavelength in particular, Blumenthal et al. disclose that the system is a wavelength division multiplexed system wherein the signals transmitted on the communication paths between transmitter and receiver include multiple wavelength channels, and Blumenthal et al. also disclose that the optical tunable filter is used to enable the electrical spectrum analyzer to measure the signal to noise ratio of each wavelength channel (page 4, paragraphs [0062] and [0068]).

Blumenthal et al. do not specifically disclose equalizing the transmission properties of a plurality of wavelengths in a wavelength division multiplexed optical transmission system or adjusting the amplitude of each transmitted wavelength at the transmitter so that the electrical signal to noise ratios of the wavelengths are substantially equal.

However, Sakamoto et al. teach a method in a wavelength division multiplexed transmission system (Figures 1 and 2) that is related to the one disclosed by Blumenthal et al., including receiving individual wavelengths (receivers "OR" receive individual wavelengths) and determining the electrical signal to noise ratio of those wavelengths. Figure 6 shows a transmitter/receiver pair in detail, whereby an individual wavelength is converted into an electrical signal at photodetector 42C, and the electrical signal is input to reception

characteristics measurement section 42G, which determines an electrical signal to noise ratio (pages 5 and 6, paragraphs [0061] and [0066]-[0068]).

Sakamoto et al. further teaches using the signal to noise ratio measurements to adjust the amplitude of each transmitted wavelength (by using control section 43 to control variable optical attenuator 41E, as shown in Figure 2, for example; page 4, paragraph [0049]) such that the calculated signal to noise ratios are substantially equal (page 6, paragraph [0074]).

It would have been obvious to a person of ordinary skill in the art to adjust the amplitudes of each transmitted wavelength as taught by Sakamoto et al. in the method disclosed by Blumenthal et al. in order to equalize the signal to noise ratios across different wavelengths as reduce deviations between the wavelength channels and thereby improve the overall multiplexed signal as suggested by Sakamoto et al. (page 1, paragraphs [0004] and [0011]).

Regarding claim 7, Blumenthal et al. disclose that the transmission system has one or more optical add/drop sites. As similarly discussed above with regard to claim 2, Blumenthal et al. disclose that a "next generation optical network" includes add/drop sites (page 1, paragraph [0006]). Blumenthal et al. disclose that their method of measuring a signal to noise ratio is specifically used in an optical transmission system that is described as a "second generation" or "next generation" network (page 4, paragraph [0062] and page 6, paragraph [0092]).

Regarding claim 11, as similarly discussed above with regard to claim 6, Blumenthal et al. disclose an apparatus for monitoring in a wavelength division multiplexed optical transmission system comprising an optical transmitter arranged to transmit to a receiver a bit sequence as a modulation of each the wavelength (Figures 1, 4, and 6), the apparatus comprising:

spectrum analyzer means disposed at the receiver (Figure 6 shows an electrical spectrum analyzer connected to a photodetector, which receives different wavelengths through an optical tunable filter) and arranged to determine, from a spectrum of an electrical signal derived from a received optical signal for each wavelength, an electrical signal to noise ratio (page 4, paragraphs [0062]-[0068]).

Again, Blumenthal et al. do not specifically disclose equalizing the transmission properties of a plurality of wavelengths or means for adjusting the amplitude of each transmitted wavelength such that the calculated optical signal to noise ratios of the wavelengths are substantially equal.

However, Sakamoto et al. teach a method in a wavelength division multiplexed transmission system (Figures 1 and 2) that is related to the one disclosed by Blumenthal et al. and further teaches using the signal to noise ratio measurements to adjust the amplitude of each transmitted wavelength (by using control section 43 to control variable optical attenuator 41E, as shown in Figure 2, for example; page 4, paragraph [0049]) such that the calculated signal to noise ratios are substantially equal (page 6, paragraph [0074]).

It would have been obvious to a person of ordinary skill in the art to include means for adjusting the amplitudes of each transmitted wavelength as taught by Sakamoto et al. in the system disclosed by Blumenthal et al. in order to equalize the signal to noise ratios across different wavelengths as reduce deviations between the wavelength channels and thereby improve the overall multiplexed signal as suggested by Sakamoto et al. (page 1, paragraphs [0004] and [0011]).

Regarding claim 12, as well as it may be understood with regard to 35 U.S.C. 112 discussed above, Blumenthal et al. disclose that the transmission system has one or more optical add/drop sites. As similarly discussed above with regard to claims 2 and 7, Blumenthal et al. disclose that a "next generation optical network" includes add/drop sites (page 1, paragraph [0006]). Blumenthal et al. disclose that their method of measuring a signal to noise ratio is specifically used in an optical transmission system that is described as a "second generation" or "next generation" network (page 4, paragraph [0062] and page 6, paragraph [0092]).

Regarding claim 13, as well as it may be understood with regard to 35 U.S.C. 112 discussed above, Blumenthal et al. in view of Sakamoto et al. suggest an optical transmission system including an apparatus for monitoring as discussed above with regard to claim 11.

Regarding claim 14, Blumenthal et al. disclose an optical receiver station for use in a wavelength division multiplexed optical transmission system (Figure 6), the receiver station comprising:

a receiver arranged to convert a wavelength into a corresponding electrical signal (s photodetector, which receives different wavelengths through an optical tunable filter); and

electrical spectrum analyzer means (shown in Figure 6 as connected to the photodetector) arranged to determine, from a spectrum of the electrical signal derived from each received optical wavelength, an electrical signal to noise ratio for that wavelength (page 4, paragraphs [0062]-[0068]).

Blumenthal et al. disclose that the optical signal includes wavelengths multiplexed together, but they specifically disclose one receiver that provides one wavelength at a time

(filtered through the optical tunable filter). They do not specifically disclose a demultiplexer or multiple receivers.

However, Sakamoto et al. teach an optical receiver station (the receiver side of terminal station 1W in Figure 5, for example) that is related to the one disclosed by Blumenthal et al., including means for receiving individual wavelengths (receivers "OR" receive individual wavelengths) and determining the electrical signal to noise ratio of those wavelengths. Figure 6 shows a receiver "OR" in detail, whereby an individual wavelength is converted into an electrical signal at photodetector 42C, and the electrical signal is input to reception characteristics measurement section 42G, which determines an electrical signal to noise ratio (pages 5 and 6, paragraphs [0061] and [0066]-[0068]).

Sakamoto et al. further teach using a demultiplexer (shown within element 12' in Figure 5) to separate the multiplexed signal into a plurality of channels and multiple receivers for receiving each one. It would have been obvious to a person of ordinary skill in the art to use a demultiplexer and multiple receivers as taught by Sakamoto et al. instead of the tunable filter and single receiver disclosed by Blumenthal et al. in order to provide detection and analysis of each wavelength together, in parallel, and thereby provide monitoring of all the wavelength channels more efficiently.

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Blumenthal et al. in view of Terahara (US 6,271,945 B1).

Regarding claim 5, Blumenthal et al. disclose a method as discussed above with regard to claim 1, but they do not specifically disclose performing the method using software. However, it is well known in the art that software on computers or processors may be used to provide

automated control of systems designed to supervise optical networks, such as disclosed by Blumenthal et al. In particular, Terahara teach a system related to the one disclosed by Blumenthal et al., including means for determining an electrical signal to noise ratio at a receiver (Figure 17, element 116), and Terahara further teach using a software on a computer to control the system (column 14, lines 3-11). It would have been obvious to a person of ordinary skill in the art to use software as taught by Terahara to implement the method disclosed by Blumenthal et al. in order to provide a means for performing the signal to noise monitoring calculations already disclosed by Blumenthal et al. and also to provide automated control of the system.

8. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Blumenthal et al. in view of Sakamoto et al. as applied to claim 6 above, and further in view of Terahara.

Regarding claim 10, Blumenthal et al. in view of Sakamoto et al. describe a method as discussed above with regard to claim 6, but they do not specifically disclose or suggest performing the method using software. However, again, it is well known in the art that software on computers or processors may be used to provide automated control of systems designed to supervise optical networks, such as disclosed by Blumenthal et al. In particular, Terahara teach a system related to the one disclosed by Blumenthal et al., including means for determining an electrical signal to noise ratio at a receiver (Figure 17, element 116), and Terahara further teach using a software on a computer to control the system (column 14, lines 3-11). It would have been obvious to a person of ordinary skill in the art to use software as taught by Terahara to implement the method described by Blumenthal et al. in view of Sakamoto et al. in order to provide a means for performing the signal to noise monitoring calculations and also to provide automated control of the amplitude adjustments in the system.

9. Claims 3 and 4 rejected under 35 U.S.C. 103(a) as being unpatentable over Blumenthal et al. in view of Roberts (US 6,128,111 A).

Regarding claim 3 and 4, Blumenthal et al. disclose a method as discussed above with regard to claim 1, but they do not specifically disclose generating a pseudorandom bit sequence.

However, Roberts teaches a system related to the one disclosed by Blumenthal et al. including monitoring a received optical signal (Figure 1) and further teach generating a signal especially for the monitoring comprising a pseudorandom bit sequence of 2^7 (or 128) bits (column 5, lines 55-60).

It would have been obvious to a person of ordinary skill in the art to use pseudorandom bit sequences as taught by Roberts in the method disclosed by Blumenthal et al. in order to provide a particular test signal for accurately monitoring the system. One in the art would have been particularly motivated to use a testing input signal with a pseudorandom bit sequence such as suggested by Roberts so that the monitoring results are not affected by any unexpected characteristics of the input signal under test and also so that measurements taken by the system over time can be fairly compared to each other.

10. Claims 8 and 9 rejected under 35 U.S.C. 103(a) as being unpatentable over Blumenthal et al. in view of Sakamoto et al. as applied to claim 6 above, and further in view of Roberts.

Regarding claims 8 and 9, Blumenthal et al. in view of Sakamoto et al. describe a method as discussed above with regard to claim 6, but they do not specifically disclose or suggest generating a pseudorandom bit sequence.

However, again, Roberts teaches a system related to the one described by Blumenthal et al. in view of Sakamoto et al. including monitoring a received optical signal (Figure 1) and

further teach generating a signal especially for the monitoring comprising a pseudorandom bit sequence of 2^7 (or 128) bits (column 5, lines 55-60).

It would have been obvious to a person of ordinary skill in the art to use pseudorandom bit sequences as taught by Roberts in the method described by Blumenthal et al. in view of Sakamoto et al. in order to provide a particular test signal for accurately monitoring the system. One in the art would have been particularly motivated to use a testing input signal with a pseudorandom bit sequence such as suggested by Roberts so that the monitoring results are not affected by any unexpected characteristics of the input signal under test and also so that measurements taken by the system over time can be fairly compared to each other.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christina Y. Leung whose telephone number is 571-272-3023. The examiner can normally be reached on Monday to Friday, 6:30 to 3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 571-272-3022. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-2600.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Christina Y Leung
Christina Y Leung
Patent Examiner
Art Unit 2633